## Computing

"Computers themselves, and software yet to be developed, will revolutionize the way we learn." Steve Jobs



Computing is essential for all children, as it is at the heart of every modern household and, therefore, will be key to their journey through life. We strive for pupils, who are equipped to use information technology, to create programs, systems and a range of content whilst instilling fundamental behaviours, which will empower children to keep themselves safe online.

The Computing curriculum has four key areas – Computer Science, Digital Literacy, Use of Technology and Safety. Each year the children undertake learning, which consolidates and builds on previous learning and utilises common programs such as Google Docs, Slides, Publisher and Sheets.

There are many junctures where children will work collaboratively, as well as individually, and it is through these opportunities that children develop their resilience as sometimes it takes several attempts to achieve the desired effect – whether this is creating a persuasive advert about a holiday destination or getting a series of sprites to complete tasks in a self-written program.

The teaching of the Computing curriculum at St. Kenelm's is highly practical with the children exploring and experimenting rather than spending time listening to lengthy instructions. This learnercentred approach enables all children to be successful and make excellent progress.

The overall aim is to equip pupils with a high-quality computing education in order for them to use computational thinking and creativity to understand and change the world. At St Kenelm's, we want pupils to be masters of technology and not slaves to it. Technology is everywhere and will play a pivotal part in students' lives. Therefore, we want to model and educate our pupils on how to use technology positively, responsibly and safely. We want our pupils to be creators not consumers and our broad curriculum, encompassing computer science, information technology and digital literacy, reflects this. We want our pupils to understand that there is always a choice with using technology and, as a school, we utilise technology to model positive use. Our knowledge rich curriculum has to be balanced with the opportunity for pupils to apply their knowledge creatively which will, in turn, help our pupils become skilful computer scientists. We encourage staff to try and embed computing across the whole curriculum to make learning creative and accessible. We want our pupils to be fluent with a range of tools to best express their understanding and hope, by Upper Key Stage 2, children have the independence and confidence to choose the best tool to fulfil the task and challenge set by teachers.

Our scheme of work for Computing is adapted from the 'Teach Computing' Curriculum and covers all aspects of the National Curriculum. This scheme was chosen as it has been created by subject experts and based on the latest pedagogical research. It provides an innovative progression framework where computing content (concepts, knowledge, skills and objectives) has been organised into interconnected networks called learning graphs.

The curriculum aims to equip young people with the knowledge, skills and understanding they need to thrive in the digital world of today and the future. The curriculum can be broken down into 3 strands: computer science, information technology and digital literacy, with the aims of the curriculum reflecting this distinction.

Teachers follow a clear progression of skills which ensure all pupils are challenged in line with their year group expectations and are given the opportunity to build on their prior knowledge.



The implementation of this curriculum ensures that, when children leave St. Kenelm's Primary School, they are competent and safe users of IT with an understanding of how technology works. They will have developed skills to express themselves and be equipped to apply their skills in computing to different challenges going forward.

The impact of our computing curriculum can not only be seen on displays around school and on the children's individual Google accounts, but also can be measured by speaking to the children themselves. The teaching of the computing curriculum enables our children to use a computer with confidence.

We measure the impact of our curriculum using the following methods:

· Formative assessment of pupils learning

· Images of the children's practical learning

- $\cdot$  Children's work saved onto their individual accounts
- · Interviewing the pupils about their learning (pupil voice)
- · Annual reporting of standards across the curriculum

# Computing Overview

#### ST KENELM'S CE PRIMARY SCHOOL Computing Curriculum Overview 2023-2024



	Autumn	Spring	Summer
YEAR 1	What technology is around us?	Pencil or keyboard?	How can we make a robot move?
YEAR 2	How does IT improve our world?	Can we make music using computers?	How can we make a robot move using algorithms?
YEAR 3	How do we use stop frame animation?	How do we edit work on a desktop publisher?	How do we programme sprites?
YEAR 4/5	How do we produce a podcast?	Can we use technology to edit images?	Can we create our own game?
YEAR 5/6	What is 3D modelling?	What makes a good website?	What are the variables in programming?

Computing Skills Progression



#### **National Curriculum Objectives**

By the end of KS1 pupils should be taught to:

- understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school
- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies





#### **National Curriculum Objectives**

By the end of KS2 pupil should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.





		Reception		Year1		Year 2		Year 3		Year 4		Year 5		Year 6
Basic Computer Skills	•	Turn on/off digital equipment.	•	Use a mouse/mouse pad Open and close programmes.	•	Log on and off a computer. Find and open previously saved work. Print work.	•	Create folders to store digital documents.	•	Organise folders to store digital documents.				
Text and Multimedia			•	Save work in a specific area Drag and drop objects on a screen. Work with others and with support to contribute to a digital class resource which includes text, graphic and sound.	•	Save and retrieve and edit their work. Change font size and colour. Use copy and paste. Generate their own work, (with help where appropriate with multimedia) combining text, graphics and sound.	•	Record and present information integrating a range of appropriate media combining text and graphics in printable form and sound and video for on-screen presentations which include hyperlinks. Begin to show an awareness of the intended audience and seek feed-back.	•	Use advanced tools in Word processing / DTP software such as tabs, appropriate text formatting, line spacing etc appropriately to create quality presentations appropriate for a known audience.	•	Multimedia work shows restrained use of effects that help to convey meaning rather than impress.	•	Consolidate
Digital Images (photos, paint, animation)	•	Interact and explore their environment using a range of multimedia equipment. With help, play back captured still or moving images, becoming familiar with the control buttons. Use programmes that allow children to select objects and animate them.	•	Use different tools in paint/draw/image manipulation software to create/modify a picture.	•	Use a range of tools in a paint package / image manipulation software to create / modify a picture to communicate an idea. Create a simple animation to tell a story. Record a video/take a picture on an iPad/recording device.	•	Take screen shots on iPads. Manipulate digital images using a range of tools in appropriate software to convey a specific mood or idea.	•	Make a short film / animation from images (still and / or moving) that they have sourced, captured or created.	•	Make a short film / animation from images (still and / or moving) that they have sourced, captured or created, combining text and audio.	•	Use images that they have sourced / captured / manipulated as part of a bigger project (eg presentation or document).

Sound and Music (Inc. sound recorders)	•	Explore ways of listening to sounds using simple programmes and devices. Explore ways of making and listening to sounds using simple programmes and devices. With help, use buttons to play back sounds on a computer and a sound player.	•	Chose suitable sounds from a bank to express their ideas. Record short speech.	•	Record sounds on an iPad/recording device. Compose music from icons. Produce a simple presentation incorporating sounds the children have captured, or created.	•	Create a simple podcast, selecting and importing already existing music and sound effects as well as recording their own.	•	Create a simple podcast, selecting, importing and editing already existing music and sound effects as well as recording their own.	•	Create multiple track compositions that contain a variety of sounds.	•	Create and share more sophisticated podcasts and consider the effect that their podcasts will have on the audience.
Handling Information (databases and graphs)	•	Collect information using digital devices. Begin to sort, classify or group various objects progressing from practical activities to the use of ICT, e.g., practically sorting fruit into colours, types or shapes, and then on-screen. Use ICT to sort and sequence objects on a screen or interactive whiteboard. Produce simple pictograms with help.	•	As a class or individually with support, children use a simple pictogram or painting program to develop simple graphical awareness / one to one correspondence.	•	Use a graphing package to collect, organise and classify data, selecting appropriate tools to create a graph and answer questions. Enter information into a simple branching database, database or word processor and use it to answer questions. They save, retrieve and edit their work.	•	Children use a simple database (the structure of which has been set up for them) to enter and save information on a given subject. They follow straight forward lines of enquiry to search their data. They talk about their experiences of using ICT to process data compared with other methods.	•	Children work as a class or group to create a data collection sheet and use it to setup a straight forward database to answer questions. They follow straight forward lines of enquiry to search their data for their own purposes. They talk about their experiences of using ICT to process data compared with other methods.	•	Enter information and interrogate it ( by searching, sorting, graphing etc). Begin to reflect on how useful the collected data and their interrogation was and whether or not their questions were answered.	•	Independently solve a problem by planning and carrying out data collection, by organising and analysing data involving complex searches using a database, and by drawing conclusions and presenting findings. The need for accuracy is demonstrated and strategies for spotting implausible data are evident. Children should be able to talk about issues relating to data protection and the need for data security in the world at large (eg health, police databases).

Modelling and simulations (spreadsheets, adventure games and simulations)	•	Explore simple simulations and find out what happens if.	•	Make simple choices to control a simple simulation program.	•	Children are able to play an adventure game and use a simple simulation, making choices and observing the results. Their conversation shows they understand that computers are good at replicating real life events and allowing them to explore contexts that are otherwise not possible.	•	Use models and simulations to find things out and solve problems. Recognise that simulations are useful in widening experience beyond the classroom. Make simple use of a spreadsheet to store data and produce graphs.	•	Use models and simulations to find things out and solve problems. Recognise that simulations are useful in widening experience beyond the classroom. Create, use and manipulate a spreadsheet (editing cells). Explore suitability of charts and graphs; making sure they are clearly labelled.	•	Set up and use a spreadsheet model to explore patterns and relationships. Make predictions. Know how to enter simple formulae to assist this process.	•	Set up and use their own spreadsheet, which contains formulae to investigate mathematical models. Ask "what if " questions and change variable in their model. Understand the need for accuracy when creating formulae and check regularly for mistakes, by questioning results. Relate their use of spreadsheets to model situations to the wider world.
Data Logging (science and maths)	•	Be aware that digital devices e.g., thermometers, metal detectors, and sound monitors can be used to show external changes.	•	Data handling online games/software to explore different charts and diagrams.	•	Data handling online games/software to explore and create different charts and diagrams.	•	Begin to use a data logger to sense physical data (light).	•	Begin to use a data logger to sense physical data (sound, temperature).	•	Use a data logger confidently, connected to the computer or remotely, to capture continuous or intermittent data readings. Interpret the results and use these in their investigations. Realise the advantages of using ICT to collect data that might otherwise be problematic.	•	Children are able to identify their own opportunities for data logging and carry out their own experiments. They check and question results and are able to spot trends in data and identify when problems may have occurred.

Electronic Communications		<ul> <li>Contribute ideas to a class email to another class / school etc.</li> </ul>	<ul> <li>Work collaboratively by email to share and request information of another class or story character.</li> </ul>	<ul> <li>Begin to understand how we communicate and share content online safely and respectfully.</li> </ul>	<ul> <li>Begin to understand the need to abide by school e-safety rules.</li> </ul>	<ul> <li>Share ICT work they have done electronically by email, VLE, or uploading to authorised sites.</li> <li>Where possible seek and respond to feedback.</li> </ul>	<ul> <li>Abide by school rules for e-safety.</li> </ul>
Research and E-Safety	<ul> <li>Use a shortcut such as an icon on the desktop to navigate to a specific website.</li> <li>Explore a teacher- selected website to find a desired page, using hyperlinks and navigation buttons.</li> </ul>	<ul> <li>As a class exercise children explore information from a variety of sources (electronic, paper based, observations of the world around them, etc.).</li> <li>They show an awareness of different forms of information.</li> </ul>	<ul> <li>Children use a search engine to find specific relevant information to use in a presentation for a topic.</li> <li>They save and retrieve their work.</li> </ul>	<ul> <li>Using another curriculum area as a starting point, children use teacher directed questions and ICT sources to find answers, making use of different search engines and evaluating results.</li> <li>Children use the information or resources they have found.</li> <li>Children talk about using ICT to find information / resources noting any frustrations and showing an emerging understanding of internet safety.</li> </ul>	<ul> <li>Using another curriculum area as a starting point, children ask their own questions then use ICT sources to find answers, making use of search engines, website indexes, menus, hyperlinks as appropriate. Children use the information or resources they have found.</li> <li>Children talk about using ICT to find information / resources noting any frustrations and showing an emerging understanding of internet safety.</li> </ul>	<ul> <li>Make use of copy and paste, beginning to understand the purpose of copyright regulations and the need to repurpose information for a particular audience.</li> <li>They show an understanding that not all information on the internet is accurate.</li> <li>Develop a growing awareness of how to stay safe when using the internet (in school and at home) and that they abide by the school's internet safety policy.</li> </ul>	<ul> <li>Independently and with due regard for safety, search the internet using a variety of techniques to find a range of information and resources on a specific topic.</li> <li>Use appropriate methods to validate information and check for bias and accuracy.</li> <li>Repurpose and make appropriate use of selected resources for a given audiences, acknowledging material used where appropriate.</li> </ul>
Understanding Technologies (individual technologies)	<ul> <li>Explore toys that simulate control devices e.g., traffic lights, scanner, microwave, cash tills, with the intention of finding out how it works.</li> </ul>	<ul> <li>Show an awareness of the range of devices and tools they encounter in everyday life.</li> </ul>	<ul> <li>Show an awareness of a range of inputs to a computer (IWB, mouse touch screen, microphone, keyboard, etc).</li> </ul>	<ul> <li>Understand the benefits of computing devices and tools over others.</li> </ul>	<ul> <li>Begin to show discernment in their use of computing devices and tools for a particular purpose and explain why their choice was made.</li> </ul>	<ul> <li>Make choices about the devices and tools they use for specific purposes and explain them in relation to the context.</li> <li>Begin to show an awareness of specific tools used in working life.</li> </ul>	<ul> <li>Evaluate the tools available to them including any that are unfamiliar or new and use them to solve problems.</li> <li>Demonstrate an awareness of the appropriateness of outcomes depending on choices regarding tools and devices.</li> </ul>

Understand Technologies (networks)		<ul> <li>Show an awareness that what they create on a computer or tablet device can be shown to others via another device (e.g. printer, projector, Apple TV).</li> </ul>	<ul> <li>Begin to show an awareness that computers can be linked to share resources.</li> </ul>	<ul> <li>Understand how an individual computer physically links to a network.</li> </ul>	<ul> <li>Show an understanding that their password is the key to accessing a personalised set of resources and files (e.g. My Documents).</li> <li>Show an awareness of where passwords are critical in everyday use (e.g. parents accessing bank details).</li> </ul>	<ul> <li>Show an understanding of the school network and how it links computers to resources in school and beyond.</li> <li>Compare this with other networks they may encounter at home or in the wider world (e.g. banks).</li> </ul>	<ul> <li>Show an understanding of how filtering and monitoring tools affect their use of the school network and Internet and compare this with their experience of access outside school.</li> </ul>
Understanding Technologies (the internet)	<ul> <li>Use a shortcut such as an icon on the desktop to navigate to a specific website.</li> <li>Explore a teacher- selected website to find a desired page, using hyperlinks and navigation buttons.</li> </ul>	<ul> <li>Use text to search for a website to navigate to.</li> </ul>	<ul> <li>Begin to understand what the internet is.</li> <li>Use websites and demonstrate an awareness of how to manage their journey around them (e.g. using the back/forward button, hyperlinks).</li> </ul>	<ul> <li>Show an awareness that not all the resources/tools they use are resident on the device they are using.</li> <li>Understand how the internet works.</li> </ul>	<ul> <li>Begin to show an understanding of URLs.</li> </ul>	<ul> <li>Perform a search using different search engines and check the results against each other, explaining why they might be different.</li> <li>Show an awareness of the need for accuracy in spelling and syntax to search effectively.</li> </ul>	<ul> <li>Use collaborative tools and e-mail showing a sensitivity for this type of remote collaboration and communication.</li> </ul>
Control (algorithms)	<ul> <li>Explore the commands needed to control a range of electronic toys.</li> <li>Use a variety of electronic toys in play situations, e.g., dance mats, Bee-bots, and remote control toys, using basic directional language.</li> </ul>	<ul> <li>Understand sequence and algorithms.</li> <li>Control simple everyday devices to make them produce different outcomes (sequence instructions (commands)).</li> </ul>	<ul> <li>Control a device, on and off screen, making predictions about the effect their programming will have.</li> <li>Sequence code blocks with loops (repetition).</li> <li>Children can plan ahead.</li> <li>Find errors in a given program (debug).</li> </ul>	<ul> <li>Children are able to type a short sequence of instructions and to plan ahead when programming devices on and off screen.</li> <li>Find errors in a program (debug).</li> </ul>	<ul> <li>Understand how to program inputs with loops. Use conditions and sensing for interactions.</li> <li>Write a program with audio inputs and outputs.</li> <li>Find and fix errors in a variety of programs (debug).</li> </ul>	<ul> <li>Engage in Logo based problem solving activities that require children to write procedures etc. and to predict, test and modify.</li> <li>Use control software to control devices (using output commands) or to simulate this on screen. Predict, test and refine their programming.</li> </ul>	<ul> <li>Independently create sequences of commands to control devices in response to sensing (i.e. use inputs as well as outputs).</li> <li>Design, build, test, evaluate and modify the system; ensuring that it is fit for purpose.</li> </ul>

### E-Safety Skills Progression



Year Group	Digital Literacy – E-Safety
EYFS	<ul> <li>Children understand that their password belongs to them.</li> <li>Children recognise the impact of good choices and consequences of wrong ones.</li> <li>Children understand that they need an adult with them when using the Internet.</li> <li>Children recognise who they can ask for help and know when they need help.</li> <li>Children understand that they need to share equipment and take turns.</li> </ul>
1	<ul> <li>Children begin to understand what personal information is and who you can share it with, including the need to keep passwords private.</li> <li>Children begin to recognise the need to know who they are sharing their learning with online and recognise the difference between real and imaginary online experiences.</li> <li>Children know who to tell when they see something that makes them uncomfortable and make sure an adult knows what they are doing.</li> <li>Children recognise the Internet as an exciting place to be but understand the need for a balance in how they spend their time and make good choices about age appropriate activities.</li> </ul>
2	<ul> <li>Children understand what personal information is and who you can share it with, including the need to keep passwords private.</li> <li>Children begin to recognise the need to know who they are sharing their learning with online and recognise the difference between real and imaginary online experiences.</li> <li>Children know who to tell when they see something that makes them uncomfortable and make sure an adult knows what they are doing.</li> <li>Children recognise the Internet as an exciting place to be but understand the need for abalance in how they spend their time and make good choices about age appropriate activities.</li> </ul>

3	<ul> <li>Children recognise the need to keep personal information and passwords private.</li> <li>They recognise the need for a secure password.</li> <li>Children understand that an adult needs to know what they are doing online and understand how to report concerns, including cyberbullying.</li> <li>Children understand that any personal information they put online can be seen and used by others.</li> </ul>
4	<ul> <li>Children understand the need for rules to keep them safe when exchanging ideas online.</li> <li>Children understand that an adult needs to know what they are doing online and understand how to report concerns, including cyberbullying.</li> <li>Children recognise the need to choose age-appropriate games to play on their devices, and when to limit use.</li> <li>Children recognise the need to protect their devices from viruses.</li> <li>Children understand that any personal information they put online can be seen and used by others.</li> <li>Children recognise that they can use online tools to collaborate and communicate with others and the importance of doing this responsibly, choosing age-appropriate websites.</li> <li>Children recognise the effect their writing or images might have on others.</li> </ul>
5	<ul> <li>Children understand the need to keep personal information and passwords private, and know how to choose a secure password.</li> <li>Children understand appropriate and inappropriate use of the Internet including excessive use.</li> <li>Children recognise the risks and rewards of using Internet communication tools and understand how to protect themselves and the devices they use.</li> <li>Children understand the need to respect the rights of other users, and understand their own responsibility for information that is shared and how it may impact on others.</li> </ul>
6	<ul> <li>Children recognise their own right to be protected from the inappropriate use of technology by others and their responsibility to report concerns.</li> <li>Children understand how to use social networking websites appropriately, keeping an adult informed about their online activity.</li> <li>They make good choices when they present themselves online.</li> <li>Children recognise the appropriate online tools to collaborate and communicate with others, understanding how to protect themselves from cyberbullying or causing hurt to others, especially when using social networks.</li> <li>Children understand the need to respect the rights of other users, and understand their own responsibility for information that is shared and how it may impact on others.</li> </ul>